DRAFT 12/8/05 TSP

IN THE CLAIMS:

1. (Currently Amended) A method, comprising:

forming a nitrogen-enriched silicon carbide-containing layer over a substrate;

modifying at least an exposed surface of said nitrogen-enriched silicon carbide-containing layer by treating the exposed surface with an inert plasma atmosphere;

forming a low-k dielectric layer over said nitrogen-enriched silicon carbide-containing layer;

performing a patterning process to form a via in said low-k dielectric layer by means of a first resist mask;

after forming said via, performing an out-gassing step to remove contaminants from said nitrogen-enriched silicon carbide-containing layer; and

after performing said out-gassing step,
performing a patterning process to form a trench in said low-k dielectric layer by means of a second resist mask; ~~and~~.

~~prior to forming said trench, performing an out-gassing step to remove contaminants.~~

2. (Previously Presented) The method of claim 1, wherein said inert plasma atmosphere is established without interrupting a vacuum condition generated during the formation of said nitrogen-enriched silicon carbide-containing layer.

3. (Previously Presented) The method of claim 1, wherein said inert plasma atmosphere is substantially established from helium.

4. (Original) The method of claim 1, wherein said nitrogen-enriched silicon carbide-containing layer is formed by plasma enhanced vapor deposition.

5. (Previously Presented) The method of claim 1, further comprising, prior to modifying the surface, purging said substrate with a gas used to establish said inert plasma atmosphere.

6. (Previously Presented) The method of claim 5, further comprising, prior to modifying the surface, establishing a stabilized gaseous atmosphere including a gas used to subsequently establish said inert plasma atmosphere.

7. (Canceled)

8. (Canceled)

9. (Canceled)

10. (Canceled)

11. (Canceled)

12. (Canceled)

13. (Currently Amended) A method of forming a metallization layer, the method comprising:

depositing a nitrogen-containing low-k barrier layer over a substrate;

modifying a surface of said nitrogen-containing low-k barrier layer by introducing noble gas atoms into a region of said nitrogen-containing low-k barrier layer by exposing said nitrogen-containing low-k barrier layer to a plasma treatment comprising a noble gas;

depositing a low-k dielectric layer over said nitrogen-containing low-k barrier layer;

patterning said low-k dielectric layer by a lithography process, wherein said modified surface reduces resist poisoning in said lithography process, wherein patterning said low-k dielectric layer includes forming a via in said low-k dielectric layer by means of a first resist mask; ~~and~~

after forming said via, performing an out-gassing step to remove contaminants from said nitrogen-containing low-k barrier layer;

after performing said out-gassing step,
forming a trench in an upper portion of said low-k dielectric layer by means of a second resist mask; and

~~prior to forming said trench, performing an out-gassing step to remove contaminants; and~~

said via and said trench
forming a metal region in said patterned low-k dielectric layer.

14. (Original) The method of claim 13, wherein said nitrogen-containing low-k barrier layer comprises silicon carbide.

15. (Previously Presented) The method of claim 13, wherein depositing said nitrogen-containing low-k barrier layer and modifying a surface thereof are performed without exposing said substrate to an ambient atmosphere.

16. (Original) The method of claim 13, wherein said plasma treatment includes establishing a plasma atmosphere on the basis of a noble gas.

17. (Original) The method of claim 16, further comprising stabilizing a gas atmosphere including helium prior to establishing said plasma atmosphere.

18. (Original) The method of claim 16, further comprising purging said substrate with a noble gas prior to establishing said plasma atmosphere.

19. (Canceled)

20. (Canceled)

21. (Previously Presented) The method of claim 13, further comprising determining a degree of said resist poisoning.

22. (Original) The method of claim 21, further comprising controlling, on the basis of said determined degree, at least one process parameter for said plasma treatment.

23. (Canceled)

24. (Currently Amended) A method, comprising:

forming a barrier layer comprised of a nitrogen-enriched silicon carbide-containing layer over a substrate;

exposing a surface of said barrier layer to a plasma ambient comprising a noble gas to thereby increase a concentration of atoms of said noble gas in a region of said barrier layer having a depth, wherein said depth ranges from approximately 0.3-3 nm;

forming at least one low-k dielectric layer above said barrier layer after said surface of said barrier layer is exposed to said plasma ambient;

patterning said at least one low-k dielectric layer by a lithography process, wherein said exposed surface reduces resist poisoning in said lithography process, wherein patterning said at least one low-k dielectric layer includes:

forming a via in said at least one low-k dielectric layer by means of a first resist mask;

after forming said via, performing an out-gassing step to remove contaminants from said nitrogen-enriched silicon carbide-containing barrier layer; and

after performing said out-gassing step,
forming a trench in an upper portion of said at least one low-k dielectric layer by means of a second resist mask; and

~~prior to forming said trench, performing an out-gassing step to remove contaminants; and~~

forming a conductive interconnection in said at least one low-k dielectric layer.

25. (Original) The method of claim 24, wherein said nitrogen-enriched silicon carbide containing layer is comprised of approximately 10-30 weight percent nitrogen.

26. (Original) The method of claim 24, wherein said noble gas is comprised of at least one of helium, argon and krypton.

27. (Canceled)